

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kojima et al (US 5,589,116).

Regarding claims 1 and 2, Kojima teaches a sintered silicon carbide body where the weight ratio of silicon carbide ranges from about 50% to about 80% by weight of silicon carbide, about 0%-30% by weight of reacted silicon carbide phase, and about 0%-40% by weight of silicon phase (col. 4, ln. 5-12).

The Examiner takes the position that Kojima teaches, thru the ranges of weight ratios, the volume ratio of silicon carbide indicated by the Applicant in claims 1 and 2. Also the Examiner takes the position that the silicon carbide sintered body of Kojima can be used as a target. Therefore, Kojima anticipates claims 1 and 2.

Regarding claim 3, Kojima teaches a sputtering target containing silicon carbide and silicon prepared by a reaction sintering method (col. 9, ln. 40-54). Even though product-by-process claims are limited by and defined by the process, determination of

patentability is based on the product itself. The patentability of a product does not depend on its method of production. MPEP 2113.

Regarding claim 4, Kojima teaches a weight ratio of impurities contained in the silicon is about 1 ppm or less (col. 4, ln. 8-10). Since this range would include zero impurities this range is anticipated by Kojima.

4. Claim 7 is rejected under 35 U.S.C. 102(b) as being anticipated by Endo et al (JP 2001-146494).

Regarding claim 7, Endo teaches a method for manufacturing a silicon carbide sintered body comprising:

- dispersing a silicon carbide powder and a carbon source into a solvent to provide a mixed powder in a slurry form (Abstract of Endo; Machine Translation of Endo pg. 8, [0041]),
- pouring the resulting mixed powder into a mold and drying the same to obtain a green material (Abstract of Endo; Machine Translation of Endo pg. 8, [0042]),
- calcinating the resulting green material at about 1200 to about 1800.degree. C. under a vacuum or inert gas atmosphere to obtain a calcined material (Machine Translation of Endo pg. 6, [0035]; pg. 8, [0042]), and
- impregnating the resulting calcined material with molten metallic silicon by capillary action to react free carbon in the calcined material with the silicon aspirated into the calcined material due to the capillary action

phenomenon thereby obtaining a silicon carbide material ((Abstract of  
Endo; Machine Translation of Endo pg. 8, [0044])).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima in view of Furese (US 5,196,386), assuming that the weight ratio is not equivalent to the volume ratios.

Regarding claims 1 and 2, Kojima teaches a sintered silicon carbide body that contains silicon carbide with a weight ratio that ranges from about 50% to about 80% by weight of silicon carbide and 0-40% weight of metallic silicon.

Kojima does not explicitly teach a volume ratio of the silicon carbide ranging from about 50% to about 70%, where the volume ratio of silicon carbide equals the entire

volume of silicon carbide/(the entire volume of silicon carbide+the entire volume of alumina) x 100

Furese teaches a volume ratio of silicon carbide to be about 50% (col. 4, ln. 12-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Kojima with a volume ratio of silicon carbide in the range of 50-70%, as taught by Furese, because it would produce a body with a high degree of toughness and mechanical strength (col. 4, ln. 30-32).

Furthermore the Examiner takes the position that the silicon carbide sintered body of Kojima can be used as a target.

Regarding claim 3, Kojima teaches a sputtering target containing silicon carbide and silicon prepared by a reaction sintering method (col. 9, ln. 40-54). Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. MPEP 2113.

Regarding claim 4, Kojima teaches a weight ratio of impurities contained in the silicon is about 1 ppm or less (col. 4, ln. 8-10). Since this range would include zero impurities this range is anticipated by Kojima.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima and Furese as applied to claim 1 above, and further in view of Takahashi (US 6,217,969 as cited in IDS).

Regarding claim 6, Kojima teaches a sputtering target with a silicon carbide powder comprising a mixture of a silicon carbide powder having an average particle size of about 0.5-20 microns (col. 3, In. 35-36), but is silent on using two different particles sizes.

Takahashi teaches the use of silicon carbide powder of two different size particles to increase the packing density of particles and the reactivity of silicon carbide during the preparation of the sintered silicon carbide (col. 3, In. 51-60). Takahashi also teaches a particle size of silicon carbide of 2 microns (col. 11, In. 54; col. 13, In. 5).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the sputtering target of Takahashi to incorporate particles of two different average sizes, as taught by Takahashi, because it would increase the packing density of particles and the reactivity of silicon carbide during the preparation of the sintered silicon carbide (col. 3, In. 51-60).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima and further in view of Endo (JP 2001-146494).

Regarding claim 7, Kojima teaches a method for manufacturing a silicon carbide sintered body comprising

- dispersing a silicon carbide powder and a carbon source into a solvent to provide a mixed powder in a slurry form,
- pouring the resulting mixed powder into a mold,

- calcinating the resulting green material at about 1200 to about 1800.degree. C. under a vacuum or inert gas atmosphere to obtain a calcined material (col. 9, ln. 26-39), and
- impregnating the resulting calcined material with molten metallic silicon by capillary action to react free carbon in the calcined material with the silicon aspirated into the calcined material due to the capillary action phenomenon thereby obtaining a silicon carbide material (col. 9, ln. 40-54).

Kojima does not teach the step of drying the slurry mixed power.

Endo teaches a method comprising dissolving silicon carbide power in a solvent, pouring the formed silicon carbide slurry into a mold and drying the slurry (Abstract of Endo; Machine Translation of Endo pg. 8, [0042]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kojima with a step for drying the slurry, as taught by Endo because it would promote contact between the silicon carbide particles, remove moisture, and increase contact strength (Machine Translation of Endo pg. 8, [0042]).

10. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima and Furese as applied to claim 1 above, and further in view of Nagasawa (JP 08-183635).

Kojima teaches a silicon carbide reaction sintered body (Abstract).

Neither reference explicitly teaches forming a covering layer on a glass plate.

Regarding claim 5, Nagasawa teaches a covering layer (SiC film) formed on a glass substrate (Abstract of Nagasawa). The volume resistivity of about  $3.0 \times 10^3$  ( $\Omega\text{cm}$ ) or less, and the refractive index of 4.16 or less measured at an optical wavelength of 633 nm, of the covering layers formed on glass substrate would be inherent to the SiC film formed on the glass substrate.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Kojima and Furesu with a covering layer, as taught by Nagasawa, because it would be useful as an X-ray mask, phase shift mask, a substrate for a TFT or optical magnetic recording media or in other areas where a transparent conductive film is needed (Machine Translation of Nagasawa, pg. 2-3, [0009]).

### ***Double Patenting***

11. Claims 1-8 rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 of U.S. Patent No. 7,335,330. Although the conflicting claims are not identical, they are not patentably distinct from each other because the Patent '330 encompasses and anticipates all the limitations of the instant claims.

12. Claims 1-8 rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,632,761. Although the conflicting claims are not identical, they are not patentably distinct from each other because the Patent '761 encompasses and anticipates all the limitations of the instant claims.

13. Claims 1-8 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7 of U.S. Patent No. 6,699,411.

Although the conflicting claims are not identical, they are not patentably distinct from each other because encompasses and anticipates all the limitations of the instant claims.

### ***Correspondence/Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Brayton whose telephone number is (571)270-3084. The examiner can normally be reached on 7:30 a.m. - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 4132

/J. B./

Examiner, Art Unit 4132

/Jessica L. Ward/

Supervisory Patent Examiner, Art Unit 4132